NON-PUBLIC?: N
ACCESSION #: 8906270388
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Beaver Valley Power Station, Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000334

TITLE: Reactor Trip/Safety Injection on Loss of Power to ASMAC Panel
EVENT DATE: 05/18/89 LER #: 89-007-00 REPORT DATE: 06/19/89

OPERATING MODE: 1 POWER LEVEL: 090

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Thomas P. Noonan, General Manager of Nuclear Operations TELEPHONE: (412) 643-1258

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: JG COMPONENT: IB MANUFACTURER: F180
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On 5/18/89, with the Unit in Power operation (Operating Mode 1) at 90 percent reactor power, a breaker labeling verification evolution was in progress. During this verification, at 0232 hours, the electrical supply breaker to the Anticipated Transient Without Scram (ATWS) Mitigating System Actuation Circuitry (AMSAC) panel was accidently opened. This loss of power to AMSAC resulted in a loss of turbine impulse pressure signal to the Steam Dump Control System, opening steam dumps valves, and lowering steam line pressure. This caused a low steam line pressure rate compensated safety injection signal and a reactor trip, at 0235 hours. The operators Utilized the Emergency Operating Procedures to stabilize the plant in Hot Standby (Operating Mode 3). An Unusual Event was declared at 0235 hours and terminated at 0310 hours. The root cause for this event was a design deficiency. This deficiency was corrected by modifying the process instrumentation circuitry to make the impulse pressure channel signals (control) independent of AMSAC. There were no safety implications to the public as a result of this event. The AMSAC system is a non safety related backup to the reactor protection system. The AMSAC system is designed to assure that the reactor coolant system will not be

overpressurized during an ATWS event.

END OF ABSTRACT

Description of Event

On 5/18/89, with the Unit at 90% reactor power, a 120VAC breaker labeling verification evolution was in progress on 120VAC Panel 22 (AC-PNL-22). At 0232 hours, during removal of a label on breaker 22-40, breaker 22-42 was inadvertently bumped open. Breaker 22-42 supplies electrical power to the Anticipated Transient Without Scram (ATWS) Mitigating System Actuation Circuitry (AMSAC). T
e Control Room operators observed AMSAC Timer Initiation and AMSAC Trouble Alarms. Steam generator level setpoint deviation alarms were also received. The operators also received alarm indication that the Feedwater Heater Bypass Valve (TV-CN-100) was open. This valve normally opens to allow condensate flow directly to the suction of the main feedwater pumps, and receives an open signal from Main Turbine First Stage Impulse Pressure Channel 447 (PT-MS-447), whenever impulse pressure senses a greater than 50% load reduction. The steam dump system actuated based on the sensed load rejection, fully opening 10 steam dump valves. The increased steam flow caused the main steamline pressures to decrease, actuating the rate compensated Low Steamline Pressure Safety Injection signal. The safety injection signal caused a resultant reactor trip signal and feedwater isolation signal. The Emergency Diesel Generators started as a result of the Safety injection Signal, however, the diesel generators did not load, as designed. An Unusual Event was declared at 0235 hours, in accordance with the Emergency Preparedness Plan, for an event involving an Emergency Core cooling System (ECCS) actuation. The operators utilized the Emergency Operating Procedures (E-0 and ES-1.1) to stabilize the plant in Hot Standby (Operating Mode 3). The safety injection was terminated at 0242 hours. This event resulted in the injection of approximately 1850 gallons of borated water into the reactor coolant system. The reactor trip breakers were closed at 0300 hours. The Unusual Event was terminated at 0310 hours. Operations and Instrument and Control (I&C) personnel then proceeded to AC-PNL-22 and found breaker 22-42 open. At 0350 hours, breaker 22-42 was reclosed, initiating the AMSAC timer. To ensure AMSAC remains armed long enough to perform its function in the event of a turbine trip, a first stage turbine pressure interlock is maintained for approximately 180 seconds. Following time-out of the timer, AMSAC initiated a turbine trip signal and an automatic start of the auxiliary feedwater pumps. The 3B motor driven auxiliary feedwater pump started. The turbine driven auxiliary feedwater pump did not start because it was previously shutdown and was not relatched, and the 3A motor driven auxiliary feedwater pump was already running, supplying feedwater since the

main feedwater pumps were not running.

Apparent Cause of the Event

The initiating event was the opening of breaker 22-42 in AC-PNL-22, which resulted in a loss of electrical supply power to AMSAC. The breaker was inadvertently bumped open during a breaker labeling verification effort. Due to the close proximity of the breakers an AC-PNL-22, while checking a label on breaker 22-40, located right above breaker 22-42, breaker 22-42 was bumped open.

The AMSAC system was installed in response to 10 CFR 50.62 "Requirements for Reduction of Risk from ATWS Events for Light Water Cooled Nuclear Power Plants. AMSAC is a non-safety related backup system to the reactor protection system. AMSAC initiates a turbine trip and actuation of the auxiliary feedwater system. AMSAC has five inputs: three (3) feed flow signals and two (2) turbine impulse pressure channels. These five channels are inputs to current loops within the AMSAC circuitry. The input isolation cards installed in the AMSAC panel have the characteristic that a loss of DC power to the isolation cards will cause the input impedance to these cards to change from a normal "on" value of about 40 ohms to a high "off" value of thousands of ohms. Current loops are used to provide the analog variable to AMSAC, a high input impedance at the current isolators effectively open circuits the current loops feeding information to AMSAC. This open circuit condition caused the other equipment serially connected to the five current loops feeding AMSAC from seeing any signal. The open circuit condition did not affect the feed flow channels since these current loops were isolated from the Feedwater Control circuits. The AMSAC impulse pressure signal current loops were not isolated from the Turbine/Steam Dump Control Circuits. The impulse pressure current loops had isolators (Foxboro Model N-2AI-I2V, Dual Current-to-Voltage Converter With Input Protection) installed which do function as isolators as long as power is supplied to the current loops. Upon the loss of power, the turbine impulse pressure signals de-energized, causing the Steam Dump Control Circuit to sense a greater than 50% load rejection. This caused the opening of the steam dump valves and the feedwater heater bypass valve.

Corrective Actions:

The following actions have been taken as a result of this event:

1. The operators utilized the Emergency Operating Procedures to stabilize the plant in Hot Standby.

2. The AMSAC turbine impulse pressure current loops were modified to provide isolation between the AMSAC circuits and the Turbine/Steam Dump Control Circuits. Post modification testing was performed to ensure that the Turbine/Steam Dump Control circuits are not affected upon a loss of power to AMSAC.

3. The Unit 2 AMSAC System was tested to ensure that the Turbine/Steam Dump Control circuits are not affected upon a loss of electrical supply power to the AMSAC System.

4. The event was issued on the INPO Nuclear NETWORK Computer System as an Operating Experience to inform other utilities of the potential for this type of event on similar equipment.

Safety Injections

The following information is provided regarding the number of safety injections, to date:

Operational - 22
Pre-Operational - 2

Reportability

This event was reported to the Nuclear Regulatory Commission at 0249 hours in accordance with 10 CFR 50.72. An additional notification of the auxiliary feedwater pump start at 0350 hours, was performed at 0510 hours, in accordance with 10 CFR 50.72. This written report is being submitted in accordance with 10 CFR 50.73.a.2.iv, as an event involving an Engineered Safety Features (ESF) Actuation.

Safety Implications

There were no safety implications to the public as a result of this event. The AMSAC system provides backup protection to the reactor protection system. AMSAC is designed to assure that the Reactor Coolant System will not be overpressurized during an ATWS event. The AMSAC system functioned as it was originally designed on a loss of electrical supply power. All Safety injection signal actuated equipment (emergency diesel generators, high head safety injection pumps, low head safety injection pumps, auxiliary feedwater pumps, river water pumps, safety injection actuated valves, and feedwater isolation equipment) functioned as designed to place the plant in a stable condition (Hot Standby).

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ND3MNO:1906

Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
LER 89-007-00

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

In accordance with Appendix A, Beaver Valley Technical specifications, the following Licensee Event Report is submitted:

LER 89-007-00, 10 CFR 50.73.a.2.iv, "Reactor Trip/Safety Injection on Loss of Power to AMSAC Panel".

Very truly yours,

/s/

T. P. Noonan
General Manager
Nuclear Operations

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Attachment

cc: Mr. William T. Russell
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